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OIPE JC172 AUG 18 2004 PATENT & TRADEMARK OFFICE

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	09/466,627
Filing Date	12/17/1999
First Named Inventor	LO
Art Unit	2176
Examiner Name	M. NGUYEN
Total Number of Pages in This Submission: 84	Attorney Docket Number: YO 999-429

ENCLOSURES *(Check all that apply)*

- [✓] Fee Transmittal Form
  - [ ] Fee Attached
- [ ] Amendment/Reply
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  - [ ] Affidavits/declaration(s)
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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 330.00

Complete if Known	
Application Number	09/466,627
Filing Date	12/17/1999
First Named Inventor	LO
Examiner Name	M. NGUYEN
Art Unit	2176
Attorney Docket No.	YO999-429

METHOD OF PAYMENT *(check all that apply)*

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

	Extra Claims		Fee from below	Fee Paid
Total Claims		-20** =		X =
Independent Claims		- 3** =		X =
Multiple Dependent				=

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	330
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 330.00

SUBMITTED BY				(Complete *(if applicable)*)	
Name *(Print/Type)*	Anne E Barschall	Registration No. *(Attorney/Agent)*	31,089	Telephone	914-332-1019
Signature	A E Barschall			Date	8/14/04

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application Ser. No.: 09/466,627 Group Art Unit: 2176

Filing Date: 12/17/1999 Examiner: M. NGUYEN

Attorney Docket Number YO999-429 Inventor Name(s): LO ET AL.

Title: METHOD AND APPARATUS FOR CONVERTING BETWEEN DATA SETS AND XML DOCUMENTS

Mail Stop Appeal Brief
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

APPEAL BRIEF

Sir:

This is an appeal from the final rejection of Claims 1-3, 7-9, 22-46, 48, 53-61, 63, 68-86.

I. REAL PARTY IN INTEREST

The real party in interest is International Business Machines Corporation, a corporation of New York.

II. RELATED APPEALS AND INTERFERENCES

The undersigned is not aware of any related appeals or interferences.

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01 FC:1402 330.00 DA

III. STATUS OF CLAIMS

Claims 1-3, 7-9, 22-46, 53-61, 63, and 68-86 stand rejected.

Claims 10-12, 16-21, 49, 51, 52, 64, 66, and 67 are withdrawn from consideration.

IV. STATUS OF AMENDMENTS

There were 4 communications under rule 116:

- May 7 arguing that the Examiner misconstrued the Bray reference;
- May 8 pointing out a defect in the date of the Turau reference;
- May 13 attempting to return the claims to their original scope; and
- June 17 (mailed June 13) submitting declarations under rule 131.

Only the communication of May 13 attempted to amend the claims. That has not been entered. The others have not been deemed persuasive by the Examiner.

V. SUMMARY OF THE INVENTION

The invention relates to converting data sources to XML in a data processing context. Figure 1 shows an overview of a data processing system. In a commercial setting, data sources are commonly used for maintaining all sorts of business information. These data sources are in many diverse formats. XML is a standardized computer protocol related to display and processing of documents over the Internet. Figure 2 shows an overview of the invention, lying between the schema 201 and data set 202 of the data source on the left side and the DTD 203 with its XML document 204 on the other side.

The original independent claims related to establishing a mapping from lists and scalars corresponding to at least one data source into XML elements and attributes. This is the scope to which the May 13 amendment attempted to return the claims.

The independent claims as they currently stand recite using a pre-established DTD. The DTD is something that the XML protocol uses in creating Internet documents or web pages. The claims further recite that based on the DTD and a plurality of data sources, annotations are added to the DTD to created an annotated DTD. This annotated DTD is such that an XML document created from the annotated DTD is guaranteed to conform to the DTD.

In general there are five sets of somewhat analogous claims relating to

a) a method;

b) a medium readable by a data processing device and resulting from the method. In other words this medium will contain the appropriate annotated DTD;

c) a data processing device using the medium;

d) a second type of medium containing software which essentially is for executing the method, i.e. for creating the annotated DTD; and

e) a data processing device using this second type of medium, i.e. using the annotated DTD.

Therefore most of the claims can be considered in groups of five, with a few exceptions.

Applicants are not going to get into the minutiae of the dependent claims in this summary section; however, as an overview, the Board should note that the rather long specification gives a comprehensive treatment of how to deal with details of the DTD and XML syntax. Working out the problem to this level of detail was a very difficult and involved process, which is addressed

by many of the dependent claims. In general, the references have failed to even touch on the same level of detail as the inventors, as will be discussed below.

VI. THE ISSUES

1. Has the date of the Turau reference been established?

2. If the date of the Turau reference has been established, do the declarations under rule 131 overcome that reference?

3. Has the Examiner correctly refused entry of the amendments to the claims of May 13?

4. Has the Examiner correctly construed the Turau reference?

5. Has the Examiner correctly construed the Bray reference?

6. Additional issues presented by the dependent claims, which will be apparent in the discussion of the relevant groups of dependent claims.

VII. GROUPING OF THE CLAIMS

The claims do not stand or fall together.

VIII. THE ARGUMENT

1. Has the date of the Turau reference been established?

The Examiner originally stated that the Turau reference was dated July 14, 1999. As evidence for this, she pulled a document creation date for the document off of the Internet.

In response to the first office action, Applicants noted that that this date was a document creation date and that as such it did not prove when the document was published.

With the final office action, the Examiner provided an e-mail from Dr. Turau indicating that the publication date was October of 1999.

The undersigned then brought to the Examiner's attention that Applicants' provisional date was also in October of 1999. The Examiner asked Applicants to contact Dr. Turau. Applicants did so, in an effort to advance prosecution, though this really was the Examiner's job in order to present a prima facie case. With the communication of June 17, Applicants provided a copy of Dr. Turau's response -- namely that he did not know what exact date in October the document of record was published. He stated that his first public release was in March of 1999.

However, it is not clear from the record precisely what was released in March of 1999 or to what extent it corresponded with the October document.

Accordingly, Applicants respectfully submit that the Examiner has not met her burden of proof of establishing the date of the Turau reference.

2. If the date of the Turau reference has been established, do the declarations under rule 131 overcome that reference?

Assuming, for the sake of argument, that the date of reference was established to be March of 1999, then the declarations under rule 131 submitted by Applicants would overcome that date. Applicants have submitted a declaration from one of the inventors, Shyh-kwei Chen, and his manager from the relevant time periods, Jen-Yao Chung. These declarations relate to the dates of conception and diligent efforts at reduction to practice. The declaring inventor also explains that he believes his co-inventor would testify similarly, but has left the employment of the Assignee and is therefore not readily available.

The declarations establish that

- the date of conception was during the summer of 1998;
- the inventors began working part time on the invention in the fall of 1998;
- the inventors worked full time reducing the invention to practice during all of 1999 and especially between January of 1999 and the dates of filing.

The declarations also attach relevant documentary evidence supporting the dates of invention including records out of the declarants computers and out of the computer of the IP Law department of the Assignee.

Accordingly, Applicants respectfully submit that they have adequately "sworn back" of the Turau reference and that this reference should be withdrawn and a new office action issued.

The Supervisory Examiner questioned whether these declarations were timely filed, seeing as they were submitted after final. Applicants respectfully submit that the date of submission was timely, since

- the date was before the present appeal;
- the Examiner presented new evidence of the date of publication at the time of the final office action; and
- documents relevant to the declarations and appended thereto were not located until after the issuance of the final office action.

The advisory action sent out in response to the communication of June 17 completely fails to address the declarations under rule 131. Applicants respectfully submit that this is improper.

3. Has the Examiner correctly refused entry of the amendments to the claims of May 13?

Applicants respectfully submit that the Examiner should allow Applicants to amend the claims to return them to their original scope. This does not raise new issues, because those claims were already searched. The amendments could not have been made earlier, because it was only in the final office action that the date problems with the reference became more apparent. Applicant accordingly respectfully submit that the refusal to enter the amendment under rule 116 of May 13 was improper.

4. Has the Examiner correctly construed the Turau reference? (claims 1-3, 46, & 61)

An issue has arisen concerning the language "pre-established DTD" in claims 1-3, 46, and 61 -- which would actually be dependent claims if the May 13 amendment were entered. Applicants have explained to the Examiner that the Turau reference generates DTD's on the fly, rather than using pre-established DTD's. It should be noted that pre-established DTD's are particularly useful in commercial situation, since they can represent standardized business forms.

The Examiner has pointed to the language in the first paragraph of page 7 as allegedly countering Applicants' position. In particular she cites the phrase "DTDs must be defined at the beginning of a file." However, ignores the fact that this phrase is part of a sentence. The first part of the sentence says "The generation of internal DTDs therefore required the usage of ***temporary*** files." [emphasis added] These are not preexisting files. They are files that are generated to create the on-the-fly DTD.

Applicants therefore respectfully submit that the Examiner has still not demonstrated that the Turau reference teaches or suggests pre-established DTD's.

In order to generate XML documents that conform to a desired and arbitrary DTD, Turau's approach needs to use XSLT stylesheets to do the extra transformation (see Turau at page 2, line 22). However, such an approach using XSLT cannot guarantee that the resulting XML actually conforms to the desired DTD -- as has been demonstrated by Aoying Zhou et al. in their article "TREX: DTD-conforming XML to XML transformations," Proceedings of the 2003 ACM SIGMOD International Conference on Management of Data.

Therefore the annotated DTD recited in Applicants' claims has a functional benefit not taught or suggested by the Turau reference.

5. Has the Examiner correctly construed the Bray reference? (claims 1-3, 46, & 61)

The Examiner recognizes certain deficiencies in the Turau reference, with respect to the independent claim 1 -- that is claim 1 as it was presented at the time of the final office action. In particular, this claim recites adding annotations to the DTD to create an annotated DTD, such that an XML document generated from the annotated DTD is guaranteed to conform to a pre-established DTD. It should be noted that this claim actually corresponds to the scope of canceled claims 13-15, 50, and 65, which Applicants attempted to re-assert in the May 13 communication under rule 116 as new claims 90-92, 94, and 96.

The Examiner attempts to correct the noted deficiency in the Turau with reference to Bray. Applicants respectfully submit that the Examiner misconstrues Bray. Bray shows annotations within an XML document. The Examiner is perhaps confused because Bray says that the "spec" is annotated. However, Bray uses the word "spec" to mean the underlying XML document. Applicants find no teachings or suggestions in Bray about DTD's at all. Accordingly,

Applicants respectfully submit that the Examiner has failed to present a prima facie case of obviousness against claim 1.

6. Additional issues presented by the dependent claims

A. Claims 25-27, 54, and 69

These claims recite associating one or more lists of data objects or formulas producing data objects with each DTD construct having a repetition symbol at the end. Repetition symbols are a tricky aspect of DTD's that need to be dealt with in order to give a full conversion between data base information and XML.

Against this recitation, the Examiner cites Turau, page 4, lines 14-18. Applicants have read this section of Turau and find no mention of repetition symbols or how to treat them at all. Instead the cited portion of Turau relates to meta data. This claim does not associate "meta data" to XML DTD elements, but "one or more lists of data objects or formulas ... ". These lists of data objects or formulas are not meta data. Formulas/functions are dynamic and can take parameters/variables, while meta data is fixed with respect to relational tables.

Applicants accordingly respectfully submit that the Examiner has failed to present a prima facie case against this group of claims.

B. Claims 28-30, 55, and 70

These claims recite associating one or more lists of data objects or formulas producing data objects with each DTD construct which is not a #PCDATA, a choice list, or an attribute list, and does not end with a repetition symbol. This portion of the invention relates to how to deal

with particular detailed aspects of the DTD portion of the XML protocol -- namely *data objects* and formulas producing data objects.

Against this recitation, the Examiner has cited page 2 of Turau. This is a general background section. Applicants have reviewed it and do not find there any teaching or suggestion of how to deal with data objects or formulas producing data objects. Moreover, Applicants find no mention of how to deal with any specific DTD constructs, such as those which are not #PCDATA, choice lists, attributes, or repetition symbols, as recited in this claim. Accordingly, Applicants respectfully submit that the Examiner has failed to make a prima facie case against this group of claims.

C. Claims 31-33, 56, and 71

These claims recite associating a value or formula producing a value with each PCDATA, choice list, or attribute definition. PCDATAs, choice lists, and attribute definitions are details of DTD syntax addressed by Applicants' very comprehensive specification.

Against this recitation, the Examiner refers to Turau's page 4, lines 12-17. Applicants find no mention of the specifics of how to deal with DTD syntax, as recited in the claims here, in the referenced section. Accordingly, Applicants respectfully submit that the Examiner has failed to make a prima facie case against this group of claims.

D. Claims 34-36, 57, and 72

These claims recite

- first associating one or more lists of data objects or formulas producing data objects with a DTD construct;

- second associating at least one of the lists or formulas with at least one variable name; and
- using the variable name as a parameter in at least one other formula.

This is a shortcut that the inventors devised as a way of shortening the conversion process between data base and XML. A variable is used in lieu of something else.

Again the Examiner refers to the general background section of Turau at page 2, which completely fails to go into this level of detail. Accordingly, Applicants respectfully submit that the Examiner has failed to make a prima facie case against this group of claims.

E. Claims 37-39, 58, and 73

These claims recite associating at least one respective environment with a respective XML element to be generated. The specification has quite a detailed treatment of the preferred embodiment for dealing with an "environment," see e.g. pages 31-33. The Board should note that the term "environment" is used as a term of art and is defined in the specification at page 33, line 2 "An environment *Env* is a set of bindings, e.g., {*x=1, y=2, z=5*}" and at page 32, line 1.

Against this recitation, the Examiner cites Turau page 7, lines 5-9. This section of Turau relates to the XML document formats and the XSL processor from Lotus. It has nothing at all to do with an "environment" as defined in Applicants' specification. Accordingly, Applicants respectfully submit that the Examiner has failed to make a prima facie case against this group of claims.

F. Claims 76-80

These claims recite that the pre-established DTD corresponds to multiple heterogeneous data sources.

Against this recitation, the Examiner recites page 7, 1st paragraph, of Turau. This paragraph mentions multiple select statements. Multiple select statements fail to teach or suggest multiple heterogeneous data sources. One can have multiple selects relating to a single type of data source. Applicants respectfully submits that this section of Turau is completely unrelated to and fails to teach or suggest the recitations of this group of claims.

G. Claims 81-83

This group of claims recites that the mapping returns at least one scalar value, at least one list of scalar values, and at least one SQL call result.

Against this recitation, the Examiner has cited figure 3 of Turau. This figure shows a user interface for Turau's system. The claim terminology, such as "SQL" and "call result" does not appear on this figure at all. Applicants are unable to discern what the Examiner is reading the claim on. Accordingly, Applicants respectfully submit that the Examiner has failed to make a prima facie case against this group of claims.

H. Claims 40-42, 59, 74

This group of claim recites that the at least one environment comprises

- information from a parent XML element of the respective XML element; and
- information from a binding specification of a DTD construct associated with the respective XML element.

Against this group of claims the Examiner cites figure one of Turau. Applicants see nothing about an environment comprising anything at all in this figure, much less what is recited. Accordingly, Applicants respectfully submit that the Examiner has failed to make a prima facie case against this group of claims.

I. Claims 43-45, 60, and 75

This group of claims recites

- the mapping includes at least one respective specification corresponding to at least one respective XML element;
- the specification comprises at least one parameter for receiving a value upon generation of the XML document; and
- the method further comprises, upon generation of the XML document, sending the at least one parameter a value according to at least one variable/value pair in the at least one respective environment.

Against this recitation, the Examiner cites pages 3 and 4 of Turau. Applicants have read this section of Turau and fail to find any of these recitations. Accordingly, Applicants respectfully submit that the Examiner has failed to make a prima facie case against this group of claims.

IX. CONCLUSION

Applicants respectfully submits that they have answered each issue raised by the Examiner and that the application is accordingly in condition for allowance. Such allowance is therefore respectfully requested.

Respectfully submitted,

By /Barschall/

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August 15, 2004

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On 8/16/04 (Mailing Date)
By /Barschall/ (Signature)

APPENDIX

1. (previously presented) A computer method, comprising executing at least the following operations in at least one data processing device:

- using a pre-established DTD corresponding to desired XML; and
- based on the DTD and a plurality of data sources, adding annotations to the DTD to create an annotated DTD, such that an XML document generated from the annotated DTD is guaranteed to conform to the DTD .

2. (original) At least one medium readable by a data processing device and embodying at least one result of the method of claim 1.

3. (previously presented) A data processing device comprising:

- the at least one medium according to claim 2, and
- at least one processor configured to use the at least one medium to produce the XML document based on the annotated DTD.

4 -6 (canceled)

7. (previously presented) The method of claim 1, wherein at least one of the data sources is a relational database.

8. (original) At least one medium readable by a data processing device and embodying at least one result of the method of claim 7.

9. (previously presented) A data processing device comprising

- the at least one medium according to claim 8; and
- at least one processor configured to use the at least one medium to produce the XML document based on the annotated DTD.

10-12. (withdrawn)

13-15 (canceled).

16 - 21 (withdrawn)

22. (previously presented) The method of claim 1, further comprising executing the following operation in the data processing device: associating values and or formulas with the DTD.

23. (original) At least one medium readable by a data processing device and embodying at least one result of the method of claim 22.

24. (previously presented) A data processing device comprising:

- the at least one medium according to claim 23; and
- at least one processor configured to
  - use the at least one medium to produce the XML document based on the annotated DTD ; and

- perform the associating operation.

25. (original) The method of claim 22, wherein the associating includes associating one or more lists of data objects or formulas producing data objects with each DTD construct having a repetition symbol at the end.

26. (original) At least one medium readable by a data processing device and embodying at least one result of the method of claim 25.

27. (previously presented) A data processing device comprising:

- at least one medium according to claim 26; and
- at least one processor configured to
  - use the at least one medium to produce the XML document; and
  - perform the associating operation.

28. (original) The method of claim 22, wherein the associating includes associating one or more lists of data objects or formulas producing data objects with each DTD construct which is not a #PCDATA, a choice list, or an attribute list, and does not end with a repetition symbol.

29. (original) At least one medium readable by a data processing device and embodying at least one result of the method of claim 28.

30. (previously presented) A data processing device comprising:

- the at least one medium according to claim 29; and
- at least one processor configured to
    - use the at least one medium to produce the XML document based on the annotated DTD; and
    - perform the associating operation.

31. (original) The method of claim 22, wherein associating includes associating a value or formula producing a value with each PCDATA, choice list, or attribute definition.

32. (original) At least one medium readable by a data processing device and embodying at least one result of the method of claim 31.

33. (previously presented) A data processing device comprising:
- the at least one medium according to claim 32; and
- at least one processor configured to
    - use the at least one medium to produce the XML document; and
    - perform the associating operation.

34. (original) The method of claim 22, wherein associating includes, not necessarily in the following order:

- first associating one or more lists of data objects or formulas producing data objects with a DTD construct;
- second associating at least one of the lists or formulas with at least one variable name; and

- using the variable name as a parameter in at least one other formula.

35. (original) At least one medium readable by a data processing device and embodying at least one result of the method of claim 34.

36. (previously presented) A data processing device comprising:

- the at least one medium according to claim 35; and
- at least one processor configured to
  - use the at least one medium to produce the XML document; and
  - perform the associating operation and included operations.

37. (original) The method of claim 1, further comprising executing the following operation in the data processing device: associating at least one respective environment with a respective XML element to be generated.

38. (original) At least one medium readable by a data processing device and embodying at least one result of the method of claim 37.

39. (previously presented) A data processing device comprising:

- the at least one medium according to claim 38; and
- at least one processor configured to
  - use the at least one medium to produce the XML document; and
  - perform the associating operation.

40. (original) The method of claim 37, wherein the at least one environment comprises

- information from a parent XML element of the respective XML element; and
- information from a binding specification of a DTD construct associated with the respective XML element.

41. (original) At least one medium readable by a data processing device and embodying at least one result of the method of claim 40.

42. (previously presented) A data processing device comprising:

- the at least one medium according to claim 41; and
- at least one processor configured to
  - use the at least one medium to produce the XML document; and
  - perform the associating operation.

43. (previously presented) The method of claim 37, wherein

- the mapping includes at least one respective specification corresponding to at least one respective XML element;
- the specification comprises at least one parameter for receiving a value upon generation of the XML document; and
- the method further comprises, upon generation of the XML document, sending the at least one parameter a value according to at least one variable/value pair in the at least one respective environment.

44. (original) At least one medium readable by a data processing device and embodying at least one result of the method of claim 43.

45. (previously presented) A data processing device comprising:

- the at least one medium according to claim 44; and
- at least one processor configured to
  - use the at least one medium to produce the XML document; and
  - perform the associating and sending operations.

46. (previously presented) At least one medium readable by at least one data processing device and embodying software adapted to perform operations comprising:

- using a pre-established DTD corresponding to the desired XML; and
- based on the DTD and a plurality of data sources, adding annotations to the DTD to create an annotated DTD, such that an XML document generated from the annotated DTD is guaranteed to conform to the DTD.

47. (canceled)

48. (original) The at least one medium of claim 46, wherein the data source is a relational database.

49. (withdrawn)

50. (canceled)

51 - 52 (withdrawn)

53. (previously presented) The at least one medium of claim 46, wherein the operations further comprise associating values and or formulas with the DTD.

54. (previously presented) The at least one medium of claim 53, wherein the associating includes associating one or more lists of data objects or formulas producing data objects with each DTD construct having a repetition symbol at the end.

55. (original) The at least one medium of claim 54, wherein the associating includes associating one or more lists of data objects or formulas producing data objects with each DTD construct which is not a #PCDATA, a choice list, or an attribute list, and does not end with a repetition symbol.

56. (original) The at least one medium of claim 54, wherein associating includes associating a value or formula producing a value with each PCDATA, choice list, or attribute definition.

57. (original) The at least one medium of claim 54, wherein associating includes, not necessarily in the following order:

- first associating one or more lists of data objects or formulas producing data objects with a DTD construct;
- second associating at least one of the lists or formulas with at least one variable name; and

- using the variable name as a parameter in at least one other formula.

58. (original) The at least one medium of claim 46, wherein the operations further comprise associating at least one respective environment with a respective XML element to be generated.

59. (original) The at least one medium of claim 58, wherein the at least one environment comprises

- information from a parent XML element of the respective XML element; and
- information from a binding specification of a DTD construct associated with the respective XML element.

60. (previously presented) The at least one medium of claim 58, wherein

- the mapping includes at least one respective specification corresponding to at least one respective XML element;
- the specification comprises at least one parameter for receiving a value upon generation of the XML document; and
- the method further comprises, upon generation of the XML document, sending the at least one parameter a value according to at least one variable/value pair in the at least one respective environment.

61. (previously presented) At least one data processing device comprising:

- means for receiving data from at least one data source;

- at least one processor adapted to perform operations comprising:

- using a pre-established DTD corresponding to the desired XML; and
- based on the DTD and a plurality of data sources, adding annotations to the DTD to create an annotated DTD, such that an XML document generated from the annotated DTD is guaranteed to conform to the DTD.

62. (canceled)

63. (previously presented) The at least data processing device of claim 61, wherein

- the at least one data source comprises at least two data sources, and the data sources are of different types; and
- the data source is a relational database.

64. (withdrawn)

65. (canceled)

66-67 (withdrawn)

68. (previously presented) The at least one data processing device of claim 61, wherein the operations further comprise associating values and or formulas with the DTD.

69. (original) The at least one data processing device of claim 68, wherein the associating includes associating one or more lists of data objects or formulas producing data objects with each DTD construct having a repetition symbol at the end.

70. (original) The at least one data processing device of claim 68, wherein the associating includes associating one or more lists of data objects or formulas producing data objects with each DTD construct which is not a #PCDATA, a choice list, or an attribute list, and does not end with a repetition symbol.

71. (original) The at least one data processing device of claim 68, wherein the associating includes associating a value or formula producing a value with each PCDATA, choice list, or attribute definition.

72. (original) The at least one data processing device of claim 68, wherein the associating includes, not necessarily in the following order:

- first associating one or more lists of data objects or formulas producing data objects with a DTD construct;
- second associating at least one of the lists or formulas with at least one variable name; and
- using the variable name as a parameter in at least one other formula.

73. (original) The at least one data processing device of claim 61, wherein the operations further comprise associating at least one respective environment with a respective XML element to be generated.

74. (original) The at least one data processing device of claim 73, wherein the at least one environment comprises

- information from a parent XML element of the respective XML element; and

- information from a binding specification of a DTD construct associated with the respective XML element.

75. (previously presented) The at least one data processing device of claim 73, wherein

- the mapping includes at least one respective specification corresponding to at least one respective XML element;
- the specification comprises at least one parameter for receiving a value upon generation of the XML document; and
    - the method further comprises, upon generation of an XML document, sending the at least one parameter a value according to at least one variable/value pair in the at least one respective environment

76. (previously presented) The method of claim 1, wherein the pre-established DTD corresponds to multiple heterogeneous data sources.

77. (previously presented) At least one medium readable by a data processing device and embodying at least one result of the method of claim 76.

78. (previously presented) A data processing device comprising:

- the at least one medium according to claim 77; and
- at least one processor configured to use the at least one medium to produce the XML document based on the mapping.

79. (previously presented) The medium of claim 46, wherein the pre-established DTD corresponds to multiple heterogeneous data sources.

80. (previously presented) The data processing device of claim 61, wherein the pre-established DTD corresponds to multiple heterogeneous data sources.

81. (previously presented) The method of claim 1, wherein the mapping returns at least one scalar value, at least one list of scalar values, and at least one SQL call result.

82. (previously presented) The medium of claim 46, wherein the mapping returns at least one scalar value, at least one list of scalar values, and at least one SQL call result.

83. (previously presented) The data processing device of claim 61, wherein the mapping returns at least one scalar value, at least one list of scalar values, and at least one SQL call result.

84. (previously presented) The method of claim 1, wherein the mapping is responsive to a user mapping specification.

85. (previously presented) The medium of claim 46, wherein the mapping is responsive to a user mapping specification.

86. (previously presented) The data processing device of claim 61, wherein the mapping is responsive to a user mapping specification.